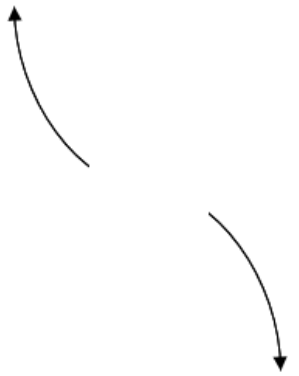
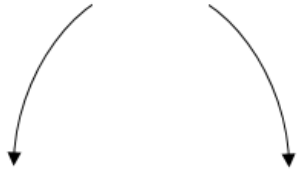
1. Describe the end behavior of the polynomial below.

$$f(x) = 7(x+5)^4(x-5)^7(x-9)^3(x+9)^3$$

A.

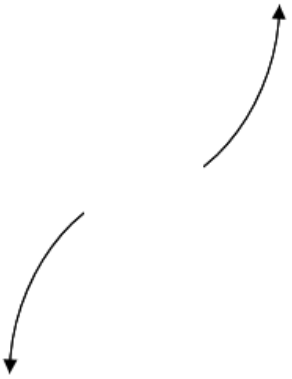


B.



C.

D.



E. None of the above.

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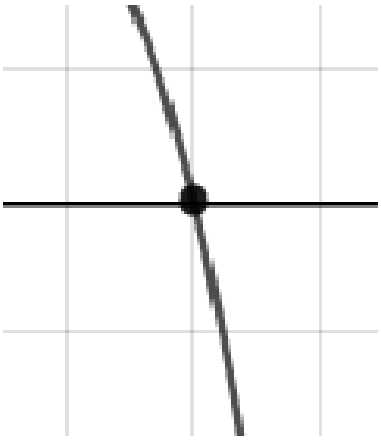
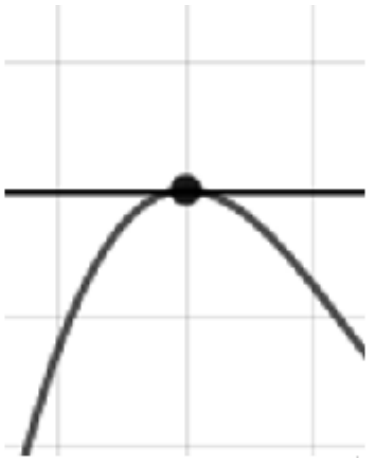
2. Describe the zero behavior of the zero $x = -5$ of the polynomial below.

$$f(x) = 3(x-3)^9(x+3)^7(x+5)^4(x-5)^3$$

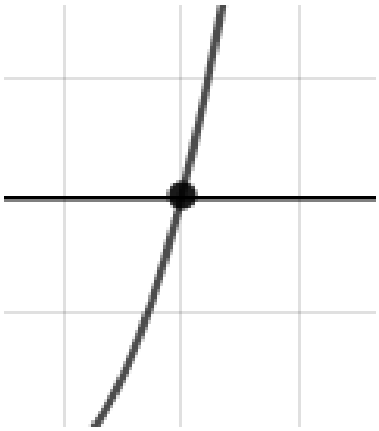
A.



B.



C. 

D. 

E. None of the above.

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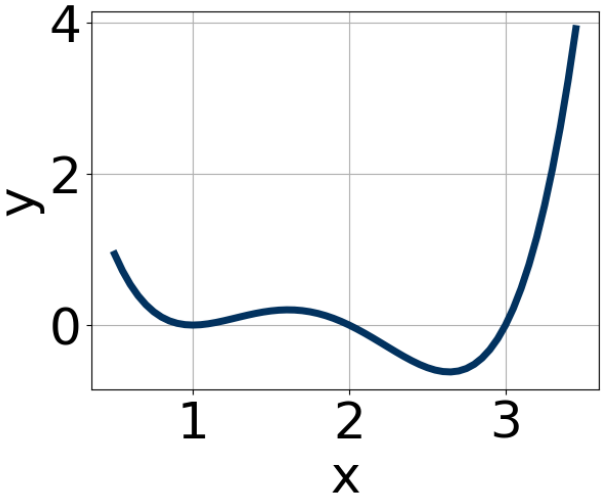
3. Which of the following equations *could* be of the graph presented below?



A. $9(x-1)^{10}(x-2)^{8}(x-3)^{5}$

B. $19(x-1)^{7}(x-2)^{10}(x-3)^{5}$

C. $-11(x-1)^{4}(x-2)^{11}(x-3)^{4}$

D. $7(x-1)^{6}(x-2)^{11}(x-3)^{7}$

E. $-6(x-1)^{10}(x-2)^{11}(x-3)^{5}$

---

4. Construct the lowest-degree polynomial given the zeros below. Then,

choose the intervals that contain the coefficients of the polynomial in the form $x^3 + bx^2 + cx + d$.

$$5 + 2i \text{ and } 4$$

A. $b \in [13, 15], c \in [64, 73],$ and $d \in [114, 122]$

B. $b \in [-4, 5], c \in [-19, -7],$ and $d \in [17, 23]$

C. $b \in [-4, 5], c \in [-8, -3],$ and $d \in [8, 14]$

D. $b \in [-16, -13], c \in [64, 73],$ and $d \in [-125, -112]$

E. None of the above.

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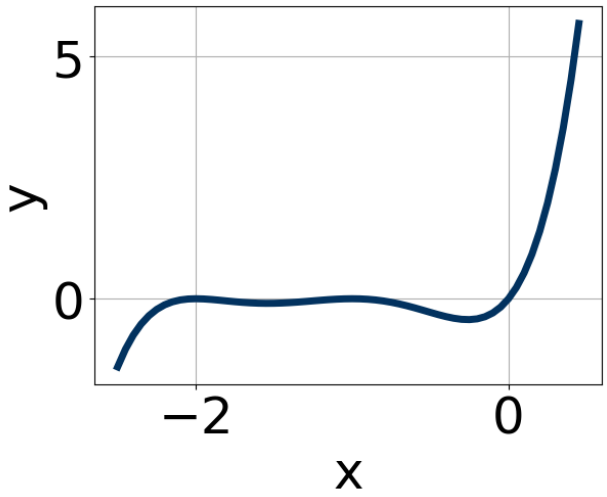
5. Which of the following equations *could* be of the graph presented below?



A. $19x^5(x+1)^6(x+2)^7$

B. $-14x^7(x+1)^{10}(x+2)^4$

C. $14x^6(x+1)^{10}(x+2)^9$

D. $-11x^4(x+1)^{10}(x+2)^4$

E. $2x^9(x+1)^8(x+2)^{10}$

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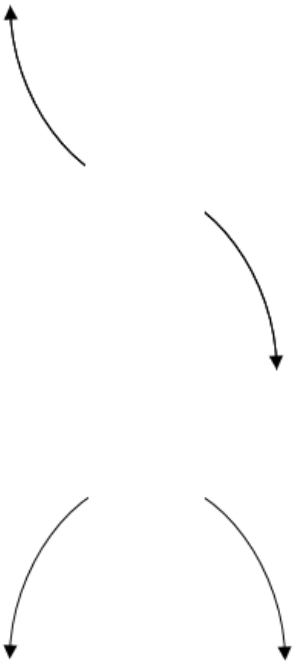
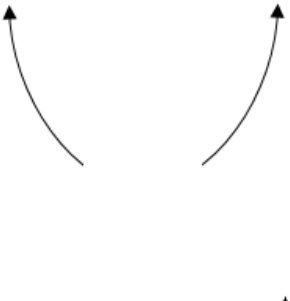
6. Describe the end behavior of the polynomial below.

$$f(x) = -4(x-4)^3(x+4)^6(x+8)^5(x-8)^5$$

A.

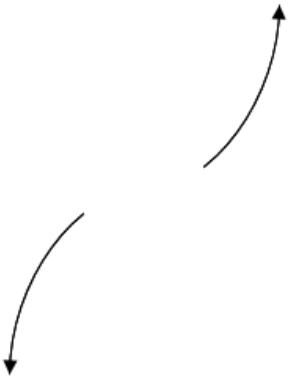


C.



B.

D.



E. None of the above.

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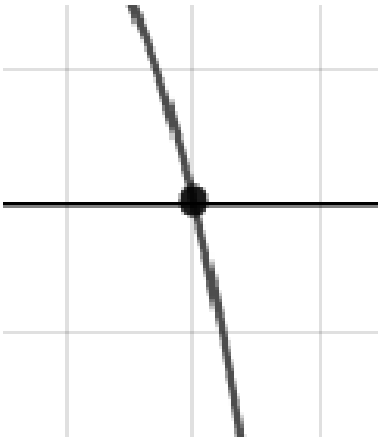
7. Describe the zero behavior of the zero $x = 9$ of the polynomial below.

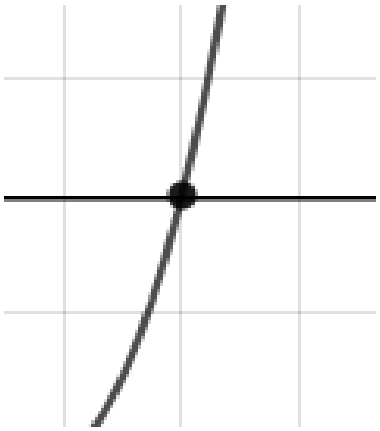
$$f(x) = -7(x-9)^4(x+9)^7(x+2)^6(x-2)^7$$

A.



B.

C. 

D. 

E. None of the above.

---

8. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $ax^3 + bx^2 + cx + d$.

$$\frac{1}{4}, 4, \text{ and } \frac{3}{5}$$

A. $a \in [12, 21], b \in [-101, -93], c \in [61, 75],$ and $d \in [-15, -8]$

B. $a \in [12, 21], b \in [-101, -93], c \in [61, 75],$ and $d \in [8, 15]$

C. $a \in [12, 21], b \in [-88, -82], c \in [23, 26],$ and $d \in [8, 15]$

D. $a \in [12, 21], b \in [95, 101], c \in [61, 75],$ and $d \in [8, 15]$

E. $a \in [12, 21], b \in [69, 77], c \in [-36, -28],$ and $d \in [-15, -8]$

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9. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $x^3 + bx^2 + cx + d$.

$$-3 + 2i \text{ and } 1$$

A. $b \in [-8, -3], c \in [7, 8],$ and $d \in [11, 14]$

B. $b \in [2, 8], c \in [7, 8],$ and $d \in [-16, -8]$

C. $b \in [1, 2], c \in [0, 4],$ and $d \in [-5, -2]$

D. $b \in [1, 2], c \in [-7, 1],$ and $d \in [0, 5]$

E. None of the above.

---

10. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $ax^3 + bx^2 + cx + d$.

$$4, \frac{-3}{5}, \text{ and } \frac{3}{4}$$

A. $a \in [19, 26], b \in [81, 88], c \in [3, 6],$ and $d \in [-37, -33]$

B. $a \in [19, 26], b \in [76, 78], c \in [-22, -18],$ and $d \in [-37, -33]$

C. $a \in [19, 26], b \in [-85, -80], c \in [3, 6],$ and $d \in [29, 39]$

D. $a \in [19, 26], b \in [46, 63], c \in [-101, -94],$ and $d \in [29, 39]$

E. $a \in [19, 26], b \in [-85, -80], c \in [3, 6],$ and $d \in [-37, -33]$
